REMARKS

Claims 1-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itani, et al. (United States Patent Number 6,650,364) in view of Parks (United States Patent Number 6,838,787). In view of the amendments to the claims and the following remarks, it is believed that claims 1-50 are allowable over the cited references. Accordingly, reconsideration of the rejections of claims 1-50 under 35 U.S.C. 103(a) based on Itani, et al. and Parks is respectfully requested.

In the present invention as claimed in amended independent claim 1, an image processing system comprises an input for receiving an input signal; a correlated double sampler (CDS) for receiving the input signal, sampling the input signal, amplifying the input signal with a first gain, and providing an output signal, the CDS comprising an amplifier for amplifying the input signal with the first gain, the first gain being settable to one of a plurality of first levels based on a digital input signal; and a programmable gain amplifier (PGA) for receiving the output signal from the CDS and amplifying the received output signal, the PGA comprising a second amplifier for amplifying the received output signal with a second gain, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA.

In the present invention as claimed in amended independent claim 15, an image processing system comprises a correlated double sampler (CDS) for receiving an input signal, sampling the input signal, amplifying the input signal with a first gain, and providing a first output signal, the first gain being settable to one of a plurality of first levels based on a digital input signal; and a programmable gain amplifier (PGA) for receiving the first output signal from the CDS and amplifying the first output signal with a second gain, and providing a second output signal, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA.

In the present invention as claimed in amended independent claim 40, a method of processing an image comprises providing a correlated double sampler (CDS) for receiving an input signal, sampling the input signal, amplifying the input signal with a first gain of the CDS, providing an output signal, and setting the first gain to one of a plurality of first levels based on a digital input signal; providing a programmable gain amplifier (PGA) for receiving the output signal from the CDS and amplifying the received output signal with a second gain of the PGA; and setting the second gain to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain being determined by a combination of the first gain of the CDS and the second gain of the PGA.

It is submitted that Itani, et al. and Parks, alone or in combination, fail to teach or suggest an image processing system comprising a correlated double sampler (CDS) comprising an amplifier for amplifying an input signal with a first gain, the first gain being settable to one of a plurality of first levels based on a digital input signal, and further comprising a programmable gain amplifier (PGA) comprising a second amplifier for amplifying a received output signal from the CDS with a second gain, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claim 1. In addition, it is submitted that Itani, et al. and Parks, alone or in combination, fail to teach or suggest an image processing system comprising a correlated double sampler (CDS) comprising an amplifier for amplifying an input signal with a first gain, the first gain being settable to one of a plurality of first levels based on a digital input signal, and further comprising a programmable gain amplifier (PGA) for amplifying a first output signal from the CDS with a second gain, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claim 15. In addition, it is submitted that Itani, et al. and Parks, alone or in combination, fail to teach or suggest a method of processing an image comprising providing a

correlated double sampler (CDS) for amplifying an input signal with a first gain of the CDS, and setting the first gain to one of a plurality of first levels based on a digital input signal; and further comprising providing a programmable gain amplifier (PGA) for receiving an output signal from the CDS and amplifying the received output signal with a second gain of the PGA; and setting the second gain to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain being determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claim 40.

Itani, et al. teaches an automatic gain control (AGC) circuit 119 that includes a first splitter 197 that produces shutter gain values and chip gain values (see Itani, et al., Figures 5A-5D and column 6, lines 45-47). The chip gain value is provided to a second splitter 198 to produce a digital gain code value and an analog (VGA) gain code value for each received chip gain value produced by the first splitter 197 (see Itani, et al., Figures 5A-5D and column 6, lines 47-50). However, while Itani, et al. compares an analog (VGA) gain to a digital gain output from the second splitter 198 (see Itani, et al., Figures 5B and 5D), there is no teaching or suggestion in Itani, et al. of the AGC circuit 119, in particular, the second splitter 198 of the AGC circuit 119, comprising a CDS for providing a first gain that is settable to one of a plurality of first levels based on a digital input signal, and a PGA for providing a second gain that is settable to one of a plurality of second levels based on the digital input signal, wherein each of the first levels are divided into the second levels, and wherein an overall gain of the system is determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claims 1, 15, and 40.

The Office Action refers to a correlated double/sample variable gain amplifier (CDS/VGA) circuit 114 of Itani, et al. as a correlated double sampler (CDS) that provides an output signal to a programmable gain amplifier (PGA). However, there is no teaching or suggestion in Itani, et al. of the correlated double/sample variable gain amplifier (CDS/VGA) circuit 114 and PGA being a CDS for providing a first gain that is settable to one of a plurality of first levels based on a digital input signal, and a PGA for providing a second gain that is settable to one of a plurality of second levels based on the digital input

signal, wherein each of the first levels are divided into the second levels, and wherein an overall gain of the system is determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claims 1, 15, and 40.

Parks teaches a charge coupled device (CCD) output amplifier 50 that is coupled to a differential amplifier 90 via a plurality of transistors 60a-60d and variable capacitors 70a-70d (see Parks, Figure 3). However, there is no teaching or suggestion in Parks of an image processing system comprising a correlated double sampler (CDS) comprising an amplifier for amplifying an input signal with a first gain, the first gain being settable to one of a plurality of first levels based on a digital input signal, and further comprising a programmable gain amplifier (PGA) comprising a second amplifier for amplifying a received output signal from the CDS with a second gain, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claim 1, or an image processing system comprising a correlated double sampler (CDS) comprising an amplifier for amplifying an input signal with a first gain, the first gain being settable to one of a plurality of first levels based on a digital input signal, and further comprising a programmable gain amplifier (PGA) for amplifying a first output signal from the CDS with a second gain, the second gain being settable to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain of the system being determined by a combination of the first gain of the CDS and the second gain of the PGA, as claimed in amended independent claim 15, or a method of processing an image comprising providing a correlated double sampler (CDS) for amplifying an input signal with a first gain of the CDS, and setting the first gain to one of a plurality of first levels based on a digital input signal; and further comprising providing a programmable gain amplifier (PGA) for receiving an output signal from the CDS and amplifying the received output signal with a second gain of the PGA; and setting the second gain to one of a plurality of second levels based on the digital input signal, each of the first levels being divided into the second levels, and an overall gain being determined by a combination of the first gain

of the CDS and the second gain of the PGA, as claimed in amended independent claim 40.

It is therefore submitted that neither Itani, et al. nor Parks teaches or suggests elements of the claims set forth above. Since Itani, et al. nor Parks teaches or suggests these claimed features, there is no way to combine the references to obtain teaching or suggestion of the claimed features, and therefore, there is no combination of the references that teaches or suggests the invention set forth in the amended claims.

Since Itani, et al. and Parks, taken alone or in combination, fail to teach or suggest the present invention set forth in amended independent claims 1, 15, and 40, independent claims 1, 15, and 40, and claims 2-14, 16-39, and 41-50 dependent thereon, are believed to be allowable over the cited references. Accordingly, reconsideration of the rejections of claims 1-50 under 35 U.S.C. 103(a) based on the combination of Itani, et al. and Parks is respectfully requested.

In view of the amendments to the claims and the foregoing remarks, it is believed that all claims pending in the application are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

There are no fees believed due at this time, however, authorization is hereby given to charge Deposit Account No. 501798 for any fees which may be due.

Respectfully submitted,

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